[45] Date of Patent:

May 10, 1988

[54]	METHOD AND APPARATUS FOR
•	OPTIMIZING SYSTEM OPERATIONAL
	PARAMETERS

[75] Inventors: David A. Bayer, New York, N.Y.; Narendra K. Karmarkar, North Plainfield; Jeffrey C. Lagarias,

Summit, both of N.J.

[73] Assignee: American Telephone and Telegraph Company, AT&T Bell Laboratories,

Murray Hill, N.J.

[21] Appl. No.: 899,191

[22] Filed: Aug. 22, 1986

379/113; 340/827 [58] Field of Search 364/402; 379/113, 221;

[56] References Cited

U.S. PATENT DOCUMENTS

4,345,116 8/1	982 Ash et a		379/221
4,669,113 5/1	987 Ash et al	L	379/221
4,704,724 11/1	987 Krishnar	et al	379/221

OTHER PUBLICATIONS

Linear Programming and Extensions, G. B. Danzig, 1963, Princeton University Press, Princeton, N.J., pp. 156-166.

"A Polynomial Algorithm in Linear Programming," Doklady Akademiia Nauk SSSR, 224:S, L. G. Kha-

chiyan, 1979, (translated in 20 Soviet Mathematics Doklady 1, pp. 191-194, 1979).

"The Ellipsoid Method: A Survey," Operations Research, vol. 29, No. 6, R. G. Bland et al., 1981, pp. 1039-1091.

"A New Polynomial-Time Algorithm for Linear Programming," Proceedings of the ACM Symp. on Theory of Computer, N. K. Karmarkar, Apr. 30, 1984, pp. 302-311.

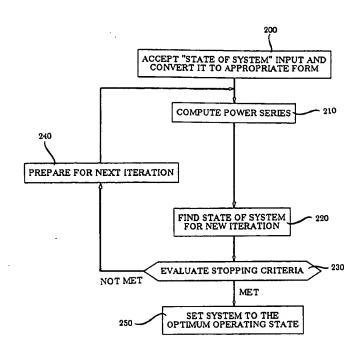
"The Ellipsoid Method and Its Consequences in Combinatorial Optimization," *Combinatorica*, 1(2), Grotschel et al., 1981, pp. 169-197.

Primary Examiner—Joseph F. Ruggiero
Assistant Examiner—Charles B. Meyer
Attorney, Agent, or Firm—Henry T. Brendzel

[57] ABSTRACT

Method and apparatus for optimizing the operational state of a system employing iterative steps that approximately follow a projective scaling trajectory or an affine scaling trajectory, or curve, in computing from its present state, x_0 to a next state x_1 toward the optimum state. The movement is made in a transformed space where the present (transformed) state of the system is at the center of the space, and the curve approximation is in the form of a power series in the step size. The process thus develops a sequence of tentative states $x_1, x_2, x_n \dots$ It halts when a selected suitable stopping criterion is satisfied, and assigns the most recent tentative state as the optimized operating state of the system.

12 Claims, 9 Drawing Sheets



340/827